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CONFERENCE TO CHANGE PERCEPTIONS OF ENGINEERED TIMBER CONSTRUCTION DELIVERS A WORRYING INSIGHT

JANE ARNOTT

Do property investors and developers contribute to the 'brakes on' mentality that lurks behind the resistance to change in the construction sector?

Major benefits not being taken up

Continued evidence of 20-30% reductions in the cost of structural systems when using new materials and technologies, such as cross-laminated timber (CLT), is not a common dialogue and in some circles is all but a whisper. However as the construction boom continues to attract attention some industry groups are beginning to question why New Zealand lags behind in exploring the uptake of new technologies, structural systems and materials that are delivering major benefits. Think cost reductions, ready availability and much faster speed of construction.

An industry 'wedded to the status quo', comfortable in the idea of 'set and forget' systems, and educational or professional

development failure to keep abreast of innovation has prevented New Zealand from experiencing the benefits that are increasingly evident in cities across the world. This was a major theme of speakers at a recent conference – 'Changing Perceptions of Engineered Timber for Construction' – held in Rotorua in May.

Rotorua Lakes Council 'Wood First' policy

The conference was organised by Grow Rotorua, the council controlled economic development arm of Rotorua Lakes Council – notably the first council in New Zealand to have a 'Wood First' policy. The policy is not original and can be traced back to British Columbia where an emphasis on timber

construction influenced the use of timber across all architectural styles.

Domination of concrete and steel

In New Zealand, even a cursory glance at our city skylines highlights that concrete and steel construction dominates. Entire systems and supply chains have been built up over decades and now represent our construction tradition, particularly in the commercial sphere. The capabilities of most architects and engineers, through to the understandings of investors and insurers (not to mention local government officials), are geared to retaining the status quo. Worse, there is an almost tacit acceptance that little will change in the short term.



Aerial view of Bealey Avenue Backpackers, Christchurch

Concrete and steel is the mainstay of multi-storey commercial and industrial construction – include in this health and hospital, retirement village, university and school infrastructure.

But as 'coalitions of the willing' begin to take shape the opportunities and benefits associated with tall timber, mass timber, engineered timber, off-site construction etc will eventually attract the interest that drives change asserts Francis Pauwels,

CEO of Grow Rotorua. 'We simply can't deny the reality of dramatic improvements in cost, labour, timeframes plus the healthier living environments afforded by engineered timber and other timbers with embedded technology.'

Currently there are small groups of highly qualified and capable people who fully understand the benefits of engineered timber but there are few vehicles to drive these home, states Dr Michael Newcombe,

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ACC Building Rotorua. Photo: Grow Rotorua & Ray Cook R&B Consultants

General Manager of Kirk Roberts Consulting Engineers. He was a keynote speaker at the conference and is one of New Zealand's most qualified and experienced structural engineers in the field of timber technology.

Dr Newcombe stressed the importance of a new industry body that could actively assist in providing and promoting technical information and knowledge transfer. 'Without sustained access to information even those with a real passion for timber and industry transformation are stymied.'

Rising costs should be causing rethink

The rising cost of the 'big three' – building materials, construction and ownership – dominates the media. That New Zealand needs to find serious and credible alternatives to the status quo is hardly news. But instead of this message being

forced home by a disgruntled timber industry, the main call for change is being spearheaded by engineers and architects who are convinced this country can ill afford to marginalise the very building technologies and materials that have a growing track record in reversing the trend of spiralling costs.

According to David Reid, President of the Timber Design Society (a technical subgroup of IPENZ), 'There are massive opportunities to take increased advantage of engineered timber as the primary structural system in, for example, multi-storey commercial buildings. Overseas experience from Australia, Europe and North America repeatedly demonstrates that these buildings can be constructed quickly and cost-efficiently. These gains are in addition to the environmental benefits of using timber.'

Arguments for new technology

The arguments for new technology are difficult to sweep aside. As Dr Newcombe explains, traditional supply chains are stretched, construction lead times are excessive and clients are looking for alternatives that are cost-effective and rapid to build. 'As engineers, we are well informed about these types of issues and we need to collectively and collaboratively evaluate how engineered timber such as CLT panels, off-site construction and 'third wave' CNC cutting tools can be applied,' he explains.

He also highlighted at the conference that concept or preliminary designs geared for structural systems in concrete and steel preclude the use of engineered timber and this undermines the opportunity for genuine cost comparisons.

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'While engineered timber is a credible structural system it is not one that can be applied midway through the process. Early engagement of the project team is essential, but problematic, given the traditional procurement and tendering strategies we have in New Zealand,' he says.

‘We must design to allow wood, and particularly the new timber technologies, to stand up on their own merits.’

Strong collaboration and good design

Dr Newcombe advocates for strong collaboration prior to concept design, and both a solid understanding and integration of different supply chains along with respect for design issues. Fabricators and manufacturers also need to be fully engaged. ‘We need to develop the habit of building effective and cohesive teams that have a common purpose in delivering new technology within a project management framework that is cost-effective and minimises risk,’ he says.

The theme of early engagement and good design was elaborated on by another keynote speaker, Dylan Brady, the Conductor of Australian-based Decibel Architecture. He highlighted the benefit of designing projects so that they ‘could be wood’ but not that they ‘must be wood’. According to Mr Brady this creates the opportunity for the timber industry to compete on an even playing field and not be disadvantaged by trying to mimic or redesign a project initially considered in traditional steel and reinforced concrete. ‘The confidence in timber will be more likely if it is encouraged rather than dictated,’ he explains.

Tendering on an equal footing

Central to Mr Brady’s perspective is for architects to design as enablers and innovators looking for the best outcome for clients, users and the environment. ‘We must design to allow wood, and particularly the new timber technologies, to stand up

on their own merits. This approach enables, in a tender situation, for all materials and systems to give it their best shot and this is when the cost-effectiveness of alternative structural systems and construction methods will be reinforced. The alternative of starting out with the assumption that only concrete and steel will suffice is a sure fire way of allowing the past to repeat itself.’

Poor knowledge about new timber solutions

Unfortunately, even getting to the point that a single design can accommodate the peculiarities of each material can be troublesome when knowledge is so thinly spread. Pip Cheshire, Director of Cheshire Architects and former President of the New Zealand Institute of Architects, agrees. ‘Systems employing laminates, laminated veneer or CLT timber as primary structural systems remain rare,’ she says.

While acknowledging risk as a factor behind the low uptake, Mr Cheshire urges sector professionals to improve their knowledge base. ‘It is well past time that all of us in the industry have an equal understanding and facility with new methods of wood construction in larger buildings and knowledge of the strengths and opportunities offered by the new engineered wood products.’

The question of how to bring about change and enable innovative construction methods and materials to get over the line was debated by almost every speaker. Mr Brady’s perspective on this was perhaps one of the most enlightening, with ‘massive timber’ construction being described

as a disruptor to existing business as usual thinkers and engineered timber, particularly CLT, being poorly understood and therefore mistrusted or associated with too much risk.

However Mr Brady was upbeat with the view that ‘designers are the natural leaders here – despite the risk aversion that is characteristic of others.’ He stressed how within his own practice it was knowing beyond all doubt that business as usual would not address the current and future challenges of both human endeavour and urban design that prompted further analysis. He says that in designing CLT buildings we are not talking about architectural or engineering competence per se, but collaboration and appreciation of the bigger concept to completion.

‘New technologies don’t develop with silo thinking and this is a major obstacle. The challenge is to build much greater capability in such things as the structural detailing, the optimal utilisation of the CLT panels in both internal and external applications, the manufacturing capacity, construction programme, transport logistics etc. All require attention in order to drive the cost efficiencies and real dollar differences through the project,’ he explains.

‘At Decibel we have learnt that harnessing innovation to economics is critical because one thing builders and investors are permanently attuned to is cost and profit. If we can prove an increased margin at the same time as a more sustainable project we believe the market will turn itself to the challenge.’ 🎯

105 PUNT ROAD, MELBOURNE

A cost-effective high-rise CLT apartment building

105 Punt Road, Melbourne is a 76 apartment building comprising eight storeys plus three levels of basement building, which is currently taking shape. It will serve as a flagship apartment building for Decibel Architecture, not only because of its use of CLT but because the design sets out to achieve a unique typology of living to the local area. At the conference Mr Brady highlighted the concept had developed around the idea of a 'townhouse in the sky', with common entrance corridors or 'streets' at every third level. These create an entry to an interlocking network of dual-fronted apartments, creating cross-ventilation and northern aspects to every apartment.

Within the project there are significant and generous communal spaces at the ground and roof levels, provided to establish and enable creative living interactions between residents and foster a sense of community. Decibel Architecture designed the project as evidence that procurement can occur using not only traditional construction methods, but also more innovative techniques such as CLT.

The CLT design was costed in the market, and returned a 20% reduction in super-structure cost, resulting in a 10% reduction in overall project cost, before further savings in foundations, time,

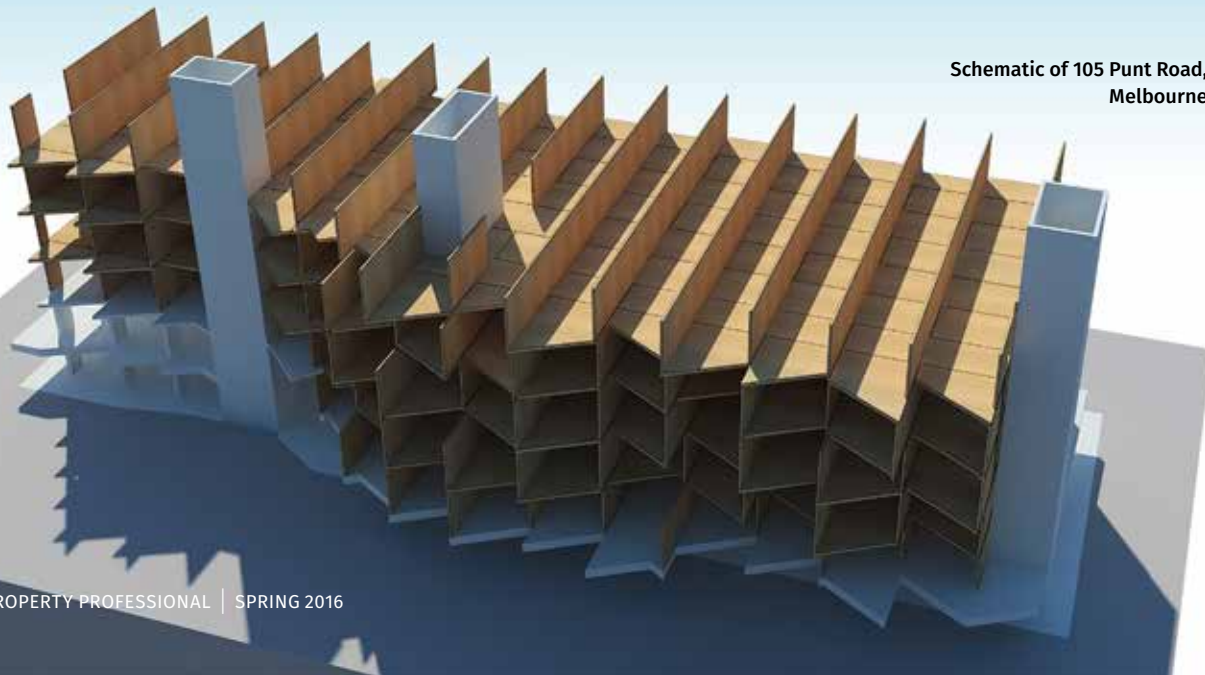
carbon and reduced wastage have been calculated. On purely economic grounds, Mr Brady believes 105 Punt Road therefore provided the developer with clear, unbiased proof of concept.

The advantages of using CLT on sites such as 105 Punt Road are:

- Quick to install, with sequenced panel unloading
- Less noise
- No wet trades, therefore reduced crew size
- No special tools needed
- Easy to install first and second fix

- Very precise structural openings
- Dimensionally stable – precise and plumb
- Clean and dust-free environment
- Cladding can be fixed straight to walls
- Minimal construction waste
- Airtightness
- Cost savings – speed of construction reduces overall programme and allows early use by client, less weight in overall structure results in more economic design, load distribution of panel structure reduces foundation loads and costs, and enhanced programming and high accuracy means windows and mechanical and electrical (M&E) systems can be pre-ordered.

As a flagship apartment building it contributes to an already reinvigorated market, but for New Zealand's current demands the deafening sound of high volume repetition will take more than a muffler or two to quell.



Schematic of 105 Punt Road, Melbourne